

REMARKS

Claims 5-14 are all of the claims presently pending in this application. Claim 12 is withdrawn from consideration as being directed to a non-elected species. Claims 1-4 were previously cancelled.

Regarding the objection to the drawings. Figs. 10-13 are hereby deleted, and Figs. 14-17 are renumbered as Figs. 10-13 accordingly. Also the specification is hereby amended to delete the reference to original Figs. 10-13 in the “Brief Description of the Drawings” section and to renumber Figs. 14-17.

The Abstract is hereby amended as suggested by the Examiner, as is the title of the invention.

The rejection of claims 8-11, 13 and 14 under 35 U.S.C. §112, second paragraph, is rendered moot by the foregoing amendments, wherein the Examiner’s suggested amendments to claims 8, 9, 11, 13 and 14 were adopted. As to claim 10, Applicants respectfully submit that the Examiner did not identify any indefiniteness that would necessitate an amendment, and thus claim 10 is not amended. Accordingly, Applicants respectfully request that the rejection be withdrawn.

The prior art rejections in view of JP ’144, JP ’188, Hatakeyama and Oare are respectfully traversed for the reasons set forth below.

The present invention requires that a fraction R of the total area occupied by filaments be 0.45 to 0.95 in an arbitrarily selected portion of the steel cord having a length of 15 mm in an axial direction of the cord, when the selected portion is viewed at an arbitrary angle. JP '144 discloses a cord in which the cross-section is depressed. When the cord is viewed at an angle, e.g., when the cord in Fig. 1 (see Appendix I) is viewed from the left side, the fraction in the cross-section thereof is 100%. Directions of short and long diameters of the depressed shape (or oval shape) of the depressed cord are substantially fixed along the longitudinal direction of the cord. Therefore, even if filaments of the cord are twisted, the ratio of the area occupied by the filaments to a cross-section obtained by making X-rays penetrate the cord along the direction of the long diameter of the depressed shape thereof is almost 100%. Accordingly, cited reference JP '144 does not disclose the cord of the present invention. That is, the cord of the present invention is one in which the fraction of the total area occupied by filaments is 45% to 95% when measured at any angle, and is an open cord in which a rubber can penetrate the cord at any angle and which is quite different from JP '144.

The cord shown in Fig. 1 of JP '188 has portions in which filaments are parallel to each other, and portions in which filaments are not parallel to each other. When a fraction of the total area occupied by the filaments in the portion in which the filaments are parallel to each other is measured at an angle (e.g., when the fraction is measured at an angle of about 30 degrees, indicated by reference character "I" in Fig. 1 (see Appendix II), with respect to one side of a square showing a cross-section of one of the portions in which the filaments are

parallel to each other), the fraction is 100%. Meanwhile, it is clear from a cross-section indicated by reference character “II” that the filaments are twisted in the portions in which they are not parallel to each other and that the filaments are brought into contact with each other, meaning that the fraction is 100%. Accordingly, the cord of JP ’188 has a fraction of 100% when measured at a specific angle and, thus, JP ’188 does not disclose the present invention.

In Hatakeyama et al., twisting of an open cord is merely drawn by lines, and the reference neither discloses nor suggests the fraction defined in the present invention.

Finally, Oare clearly fails to supply the deficiencies of the primary references.

Accordingly, Applicants respectfully request that the prior art rejections be withdrawn.

In view of the preceding amendments and remarks, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue that the Examiner feels may be best resolved through a personal or telephonic interview, she is kindly requested to contact the undersigned attorney at the local telephone number listed below.

AMENDMENT UNDER 37 C.F.R. §1.111
U.S. SERIAL NO. 09/853,653

ART UNIT 1733
Q64382

A Petition for Extension of Time with appropriate fee accompanies this document. The USPTO is directed and authorized to charge all additional required fees (except the Issue Fee and/or the Publication Fee) to our Deposit Account No. 19-4880. Please also credit any overpayment to said Deposit Account.

Respectfully submitted,



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23373
CUSTOMER NUMBER

Date: September 9, 2003

APPENDIX I

(4)

特開平7-189144

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カーカス: 1500デニール(D)/2 1枚
ベルト層: 表1のコード構造の欄に記載されているコードを有する2枚切り離し構造
ベルト補強層: 図9に示されるキャップ層及びレイヤー層

JP-A

【0022】表1及び表2に記載されているゴム浸透性、コード折れ性及びベルト端セパレーションの試験方

N0.7-189144法は以下のとおりである。

【ゴム浸透性】ゴム浸透性(ゴムペネトレーション)は、タイヤ中の1本のベルトコードを取り、コード全員に渡り内部に侵入したスチールフィラメントのゴム被覆長さを評価し、百分率で表した。外傷を伴う耐久性の評価メジャーとして用いた。数値が大きいほど好ましい。

【コード折れ性】各コードを一定の強度を持つように打ち込みを調節したベルト層に用い、タイヤを実車に装着し、同様の走行条件の下に同一距離走行後、タイヤを解剖してコード折れ本数を数え、コントロールタイヤでの折れ本数を100としたときの指標で評価した。指標が小さいほど良好な結果を示す。ここでコントロールタイヤは、図5に示したコードを同様にベルトに供したタイヤとした。

【ベルト端セパレーション】ドラム試験によって、JIS正規内圧荷重で2万km走行後、ベルト端セパレーションの有無を解剖後測定した。

【0023】ベルト層に本願の1×4オープン構造を持つコードを用いた実施例のものは、比較例のものに比べて十分なゴム浸透性を保ちながらコード折れ性も優れている。またそれを使用した空気入りタイヤにおいては、比較例のものを使用したタイヤに比べ、ベルト端セパレーションが発生せず耐久性が優れているといえる。

【0024】

【発明の効果】この発明のゴム物品補強用スチールコー

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ドによれば、加硫時にコードに加わる圧力によりコードがクローズ化することなく、ゴム浸透性及びコード折れ性に優れたコードを得ることができる。またそのコードを本発明の範囲で空気入りラジアルタイヤに適応することにより、より耐久性に優れた空気入りタイヤを得ることができる。

【0025】

【図面の簡単な説明】

【図1】この発明に従うスチールコードの断面図である。

【図2】この発明に従うスチールコードの断面図である。

【図3】スチールコードの偏平比によるコード間距離を図示し、ベルト端セパレーションの起きやすさを示している。

【図4】断面形状の異なるコードについての圧縮歪み-圧縮荷重曲線である。

【図5】この発明と比較するスチールコードの断面である。

【図6】この発明と比較するスチールコードの断面である。

【図7】偏平比とコード折れ指数との関係を示す表である。

【図8】スチールコードの偏平比による加硫時の挙動の違いについて図示している。

【図9】この発明に従う空気入りタイヤのベルト補強層の一例である。

【符号の説明】

1 フィラメント

30 a 楕円の長軸

b 楕円の短軸

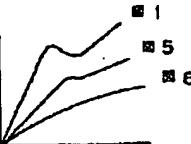
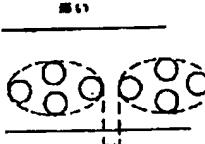
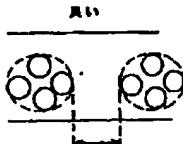
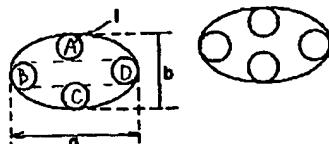
fig.1 【図1】

【図2】

【図3】

【図4】

When viewed from this angle, the cross-section is as follows.



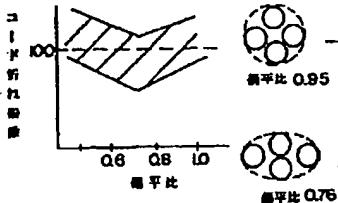
【図5】 【図6】

【図7】

【図8】

【図9】

The fraction defined in the present invention is 100%.



Even if the filaments are twisted, the direction of short diameter b is fixed.



When viewed from angle X, the cord has a fraction, defined in the present invention, of almost 100%.

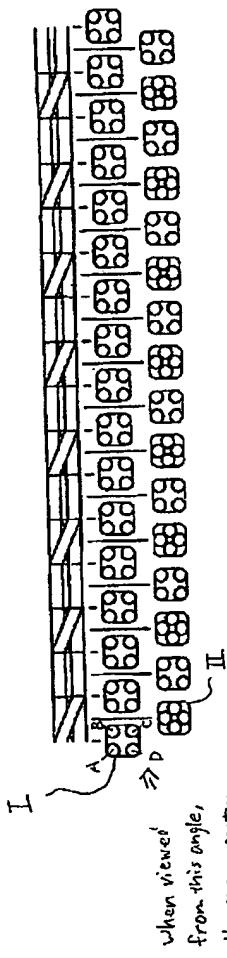
APPENDIX II

JP-A No. 10-18188

(6)

特開平10-18188

【図1】



The filaments are twisted and are brought into contact with each other, meaning that the friction is 100% when viewed at any angle,

The friction defined in the present invention is 100%

【図2】

